

NOTES, INFORMATION & NEWS

The Century's Finest

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At the beginning of the last century the malacological world was privileged to have an array of distinguished practitioners. William H. Dall and Paul Bartsch at the Smithsonian Institution, Henry A. Pilsbry at the Academy of Natural Sciences in Philadelphia, Harold Heath at Stanford University, S. Stillman Berry in Redlands, California, and numerous others led the way in describing the living and fossil molluscan fauna of North America. These workers ultimately described over 10,000 taxa, and their efforts capped what might be thought of as the "Golden Age" of American malacology. However, the most influential malacologist of the twentieth century would not be born for another 40 years. In contrast, he would describe only a handful of taxa in a career that spanned the last half of the century, but there is no denying the import of his contributions to the field of malacology and far beyond.

Stephen Jay Gould was born on September 10, 1941, in Queens, New York. Like many students of natural history his fascination with organisms began at an early age, and the dinosaur exhibit in the American Museum of Natural History in New York was a favorite destination. Steve obtained his undergraduate degree in Geology at Antioch College, and went on to graduate work at Columbia University, receiving his Ph.D. in 1967. However, the question he chose for his dissertation was not in deep time but rather in the shallow sand dunes of Bermuda. Steve had become fascinated by the diversity of land snails there and in the Bahamas and he sought to understand their insular evolutionary patterns. Papers on *Poecilozonites* and *Cerion* soon followed, many co-authored with David Woodruff. In 1984, Steve described his first two species—the Giant and Dwarf Smokestack *Cerion* (*Cerion excelsior* Gould, 1984a, and *Cerion caminus* Gould, 1984a, respectively).

From his study of Bahaman land snails Steve noticed that morphological evolution in *Poecilozonites* was not gradual: rather, large changes appeared suddenly, and these morphological reorganizations were short lived in the fossil record and followed by another period of stasis. Another Columbia University graduate student had noticed a similar pattern in the diversification of trilobites, and after comparing notes they joined forces as Eldredge & Gould (1972) to unleash punctuated equilibrium on a paleontological world unaware of its reliance on a cloven hoof print of theory—gradualism. To be certain, the pres-

ence of stasis in the fossil record had been noticed much earlier (e.g., Dall, 1877), but rather than eschew it as artifact (or use it to argue against Darwinian evolution), Eldredge and Gould embraced it as the fossil signature of allopatric speciation and extended its implications into macroevolution theory.

In 1977 *Ontogeny and Phylogeny* was published. This seminal volume recovered the baby that had been thrown out with Haeckel's bathwater, and foreshadowed the resurgence of the field of evolutionary development. It also had a profound influence on a cohort of graduate students who read the book in seminars across the country. Molluscan examples were scattered throughout the text, including Ockelman's (1964) study of small insular bivalves, Stanley's (1972) progenetic transitions in bivalve habits, Hoagland's (1975) dissertation work on life history evolution in *Crepidula*, as well as Steve's own work on *Poecilozonites* and *Cerion*.

It is not surprising that mollusks also figured prominently as study organisms among Steve's students. These students included Warren Allmon (1988) who investigated heterochrony in the evolution of *Turritella* shell morphology, Dana Geary (1986) who studied a Late Miocene radiation of melanopsid gastropods, and Jane Rose (1990) who examined the relationship between ecology and variation in *Cerion*. Many of his students' themes were familiar, the relationships between ontogeny and phylogeny, and comparisons of punctuated vs. gradual patterns of diversification. Where necessary, there was a sophisticated array of statistical and multivariate analyses to quantify morphology and search for patterns through time. Steve often had an impressive multivariate methodology in his own work (e.g., Gould, 1967, 1970, 1984b) and his rigorous quantitative approach was mirrored in the work of many of his students.

It is also well known that Steve was not a "computer geek," and many obituaries have commented on his avoidance of word processors and POP3 compliant programs. I also doubt that Steve ever navigated PAUP* or MacClade, but his own personal aversions never limited his students' research programs; for example phylogenetic analyses were prominent in the work of Morris (1991) and Yacobucci (1999).

Mollusks also served as exemplars in Steve's column "This View of Life" that appeared in the pages of *Natural History Magazine*. His commentaries dealt with natural history issues that ranged from hens' teeth to the dating of the beginning of the millennium; and mollusks often graced those pages as well. In fact, the story of an extinct little limpet once even found its way into a column! However, the importance of those articles (and their

afterlives in collected volumes) should not be underestimated for they translated the esoteric reports of our research into popular pieces that have so far entertained and educated two generations of lay naturalists.

Although Steve's presence in the twenty-first century will be remembered as fleeting, this century will be marked by his greatest contribution, his *magnum opus*—*The Structure of Evolutionary Theory* (2002). Steve's view of evolution as outlined in 1433 pages is (as it ever was) pluralistic and hieratical, and for that he took substantial criticism from fundamental Darwinians and others (Morris, 2001). Steve's ideas (as well as his prose) often exasperated some while inspiring others and this book is no different. David Wake (2002) has predicted that *The Structure of Evolutionary Theory* "... will be a permanent factor in the struggle to understand how life has evolved." Like Steve's other writings, *The Structure of Evolutionary Theory* contains numerous molluscan examples supporting his view of the history of life—from the punctuated evolutionary patterns of melanopsid speciation to the spandrels of trochacean brooding.

Steve Gould's death on May 20, 2002, ended the career of the last century's finest malacologist, but his legacy to malacology is immense. Steve never produced a classic monograph or performed cladistic analyses that spawned cascades of nomenclatural changes, and his name will appear as taxon author on only a few leaves on the tree of life. Nevertheless, his contribution to our field transcends all of these conventional measures. Steve showed us how mollusks could be used to unravel the patterns and processes of the last half a billion years of life, and when current theories and models failed to explain these patterns, Steve was not shy about proposing new ones.

In fairness, Steve was not the only one to travel down this path. His cohort includes such eminent colleagues as Michael Ghiselin, Steve Stanley, and Geerat Vermeij—malacologists all—who have extended our collective vision beyond the usual taxon-based questions and practices that we typically undertake. They took our (and their) favorite taxon and addressed a broad suite of evolutionary questions that provide insights into some of the processes that have shaped the history of life on earth, and they shuffle shells (and the shell-less) with the best of them. I observed Steve during a visit he made to Berkeley in 1988 move effortlessly through our *Cerion* holdings, suggesting mixed lots and re-identifying specimens. He also searched the vermetids for especially meandering specimens. Their openness intrigued him, rules were being broken, and the transition seemed to mark an important yet unknown event in both their ontogeny and phylogeny. He clearly understood and relished the value of museum collections and was just as accomplished there as he was penning an introduction to a research paper that would cast *Achatinella* as the devil's advocate and the Rev. Glick as Mephisto (Gould, 1971).

One cannot help but notice the parallels between the

turn of the last century and today. The malacological contributions and scope of work by Dall, Pilsbry, Berry, and others in the early 1900s were enormous and often viewed as insurmountable by later workers. Up until about 20 years ago, most American malacological polls would have undoubtedly chosen one of these gentlemen's contributions as the most significant of the twentieth century. Today the work of Gould and others has shown us the potential of molluscan studies, and set new standards and expectations for modern malacological research. However, I doubt that Steve will vie for first place at the end of the current century. That spot will likely be reserved for a malacologist who has yet to undergo meiosis. We cannot predict where his or her future contributions may lie. I suspect that assembling the unfalsified Mollusca branch of the tree of life or determining the regulatory cascades of the key innovations in the diversification of the molluscan *bauplan* will certainly occur in the next 98 years. However, since we cannot know our future intellectual descent's contingencies we have no way to predict the directions of that future research. Therefore we might as well just get on with the work before us—Steve would have it no other way.

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**Anatomical Description of *Pisidium johnsoni*
E.A. Smith, 1882 (Bivalvia: Sphaeriidae)
from Madagascar**

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Kuiper (1966) reported five species of the genus *Pisidium* C. Pfeiffer, 1821, from Madagascar, one of them [*P. casertanum* (Poli, 1791)] being cosmopolitan, two (*P. ovampicum* Ancy, 1890, and *P. viridarium* Kuiper, 1956) representing the African fauna, and two (*P. johnsoni* E.A. Smith, 1882, and *P. betafoense* Kuiper, 1953) being restricted to the island. *P. johnsoni* was the most interesting among these species, since its similarity to the Holarctic *P. milium* (Held, 1836) was noted (Kuiper, 1966). However, no anatomical data on the species were available until now, whereas soft body characters have proved to be rather informative for the systematic and phylogenetic studies in Palearctic and African Sphaeriidae (Korniuschin, 1998a, b).

Recently, we examined a sample from Central Madagascar, now deposited in the Field Museum of Natural History, Chicago (FMNH), containing two *Pisidium* species. One of the species (FMNH 296603) was identified as *P. viridarium*, and its anatomical characters were in good agreement with those reported in the literature (Korniuschin, 1998b). The other species (now FMNH 296604)

appeared to be *P. johnsoni*, and a description of its anatomy is provided below. The species identification was confirmed by comparison with the lectotype of *P. johnsoni* deposited at the Natural History Museum, London (BMNH) and examined by the senior author in 1995.

For comparison, materials from the collections of D. S. Brown (*Pisidium ovampicum*) and A.V. Korniuschin (*P. milium*) were used.

All samples were preserved in alcohol. Anatomical characters were observed under a stereomicroscope and drawn with a camera lucida. Gill and mantle preparations were processed according to Korniuschin (1995).

Below a description of the anatomical characters and a brief discussion of the possible relationships of the examined species are provided.

Pisidium johnsoni E.A. Smith, 1882

Material: Lectotype BMNH 82.3.5.23, 20 lieu (about 80 km) from Tananarivu, Madagascar; FMNH 296604, 1 km N of Ilempona, approx. 40 km NE of Antsirabe, Central Madagascar, in a shallow ditch along railroad tracks, leg. R. Webranitz 15 December 1989, 3 specimens.

Shell characters (Figures 1A, B): Specimens FMNH 296604 corresponding with the published description (Kuiper, 1966) and the lectotype.

Adductor muscles: Posterior adductor small, oval (Figure 1C). Anterior adductor bean-shaped, markedly shifted upward (dorsally).

Mantle: Mantle edge thickened by strong development of longitudinal muscles (Figures 1C, F). Presiphonal suture markedly elongated, longer than pedal slit. Inner radial mantle muscles arranged in four strong and clearly defined bundles, three of them (anterior) placed at edge of pedal slit close to each other, posterior bundle at distal end of presiphonal suture.

Gill: Outer demibranch placed at tenth filament of inner one (two specimens examined). Brood pouch in low position (Figure 1D), formed by four filaments of inner demibranch and partly covered by the inner (ascending) lamella. Three large larvae found in each of studied pouches.

Nephridium: Open type (pericardial duct visible between branches of dorsal lobe), dorsal lobe quadrangular (Figure 1E).

Remarks: The elongated presiphonal suture and very short pedal slit were noticeable also in the dried soft body of the lectotype (Figure 1G).

Pisidium johnsoni has a very peculiar anatomy and is distinctly different from other species of *Pisidium*. However, it is similar to the Holarctic *P. milium* (see Korniuschin, 1996) in its very short pedal slit, in addition to the shell characters reported by Kuiper (1966). A similar anatomy was also reported for the Madagascar and Af-